



United States  
Environmental Protection  
Agency

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www.epa.gov/dfe

Pollution Prevention and Toxics (7406)

# The U.S. Environmental Protection Agency's Design for the Environment Program

## Partnerships for a Cleaner Future

## Why Design for the Environment?

Businesses today face a variety of challenges—maintaining high-quality goods and services at low cost, staying competitive in a global marketplace, and meeting consumer preferences for more environmentally friendly products. To help businesses meet these challenges, EPA is building on the *design for the environment* concept pioneered by industry and encourages businesses to incorporate environmental considerations into the design and redesign of products and processes.

*Benefits include:*

- Cost savings
- Reduced business and environmental risks
- Expanded business and market opportunities

*Pollution prevention*—the reduction or elimination of pollution at the source—is given preference to recycling, treatment, or disposal.

## How does a business “design for the environment?”

- By evaluating the human health and environmental impacts of its processes and products.
- By identifying what information is needed to make human health and environmental decisions.
- By conducting an assessment of alternatives.
- By considering cross-media impacts and the benefits of substituting chemicals.
- By reducing the use and release of toxic chemicals through the innovation of cleaner technologies that use safer chemicals.
- By implementing pollution prevention, energy efficiency, and other resource conservation measures.
- By making products that can be reused, refurbished, remanufactured, or recycled.
- By monitoring the environmental impacts and costs associated with each product or process.
- By recognizing that although change can be rapid, in many cases a cycle of evaluation and continuous improvement is needed.

## What is EPA's DfE Program?

The U.S. Environmental Protection Agency's (EPA's) Design for the Environment (DfE) Program is a voluntary partnership program that works directly with industries to integrate health and environmental considerations into their business decisions. A DfE partnership helps businesses design or redesign products, processes, and management systems that are cleaner, more cost-effective, and safer for workers and the public. The DfE Program usually works with industry sectors to compare the human health and environmental risks, performance, and costs associated with existing and alternative technologies or processes. A DfE solution may entail the redesign of a formulation, a manufacturing or service-sector process, or a management practice.



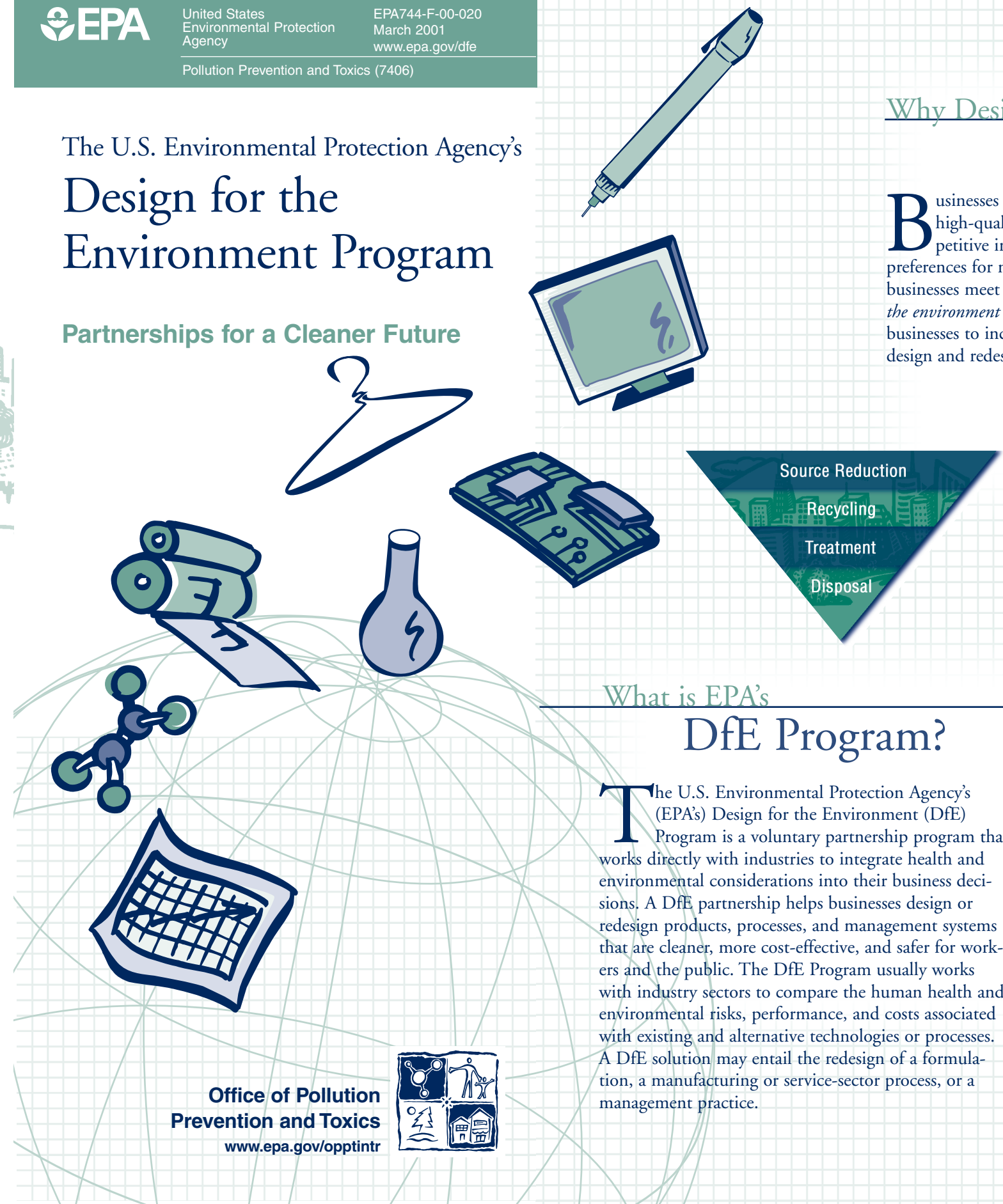
### FOR MORE INFORMATION

Publications and materials produced by each of the industry partnerships are available on the DfE Web site at [www.epa.gov/dfe](http://www.epa.gov/dfe). Contact DfE at 202-260-1678, [dfe@epa.gov](mailto:dfe@epa.gov), or:

Pollution Prevention Information Clearinghouse  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, NW. (7409)  
Washington, DC 20460  
Telephone: 202-260-1023  
Fax: 202-260-0178  
E-mail: [ppic@epa.gov](mailto:ppic@epa.gov)

or:

National Service Center for Environmental  
Publications (NSCEP)  
Telephone: 513-489-8190  
800-490-9198



Office of Pollution  
Prevention and Toxics  
[www.epa.gov/opptintr](http://www.epa.gov/opptintr)



## How does DfE partner with businesses?



DfE forms voluntary partnerships with industry sectors, usually through industry leaders and trade or technical associations. These partnerships also

can include public interest groups, universities, research institutions, and other government agencies at the federal, state, and local level.

For each partnership, DfE ensures that information on traditional and alternative technologies reaches the people who make the decisions—such as managers, engineers, purchasers, and end users. DfE provides these decision makers with a variety of materials, such as technical reports, fact sheets, bulletins, case studies, software, videos, and training manuals. These materials are distributed throughout the industry so that companies can make more informed decisions that reduce risks to workers and the environment and even boost their bottom line. DfE's Web site ([www.epa.gov/dfe](http://www.epa.gov/dfe)) keeps partners and other customers informed of new developments.

## How does a business start designing for the environment?

A business can initiate a DfE project on its own or with the assistance of its industry trade or technical association. Associations can provide financial resources and share information, including incentives to making changes and the recognition of businesses that have overcome obstacles. If a particular company believes that its industry can benefit from a DfE project, it should bring this to the attention of an appropriate association to see if broader industry interest exist. Associations are encouraged to contact EPA's DfE Program for information on how to either propose a partnership with EPA or initiate projects on their own. Businesses also can design for the environment on their own by using the models and templates developed by the DfE Program.

## Do all EPA DfE partnerships take the same approach?

There are six different approaches to *designing for the environment*. To achieve its goals, a DfE partnership may use one or more of the following approaches:

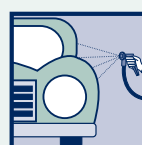
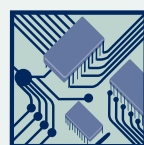
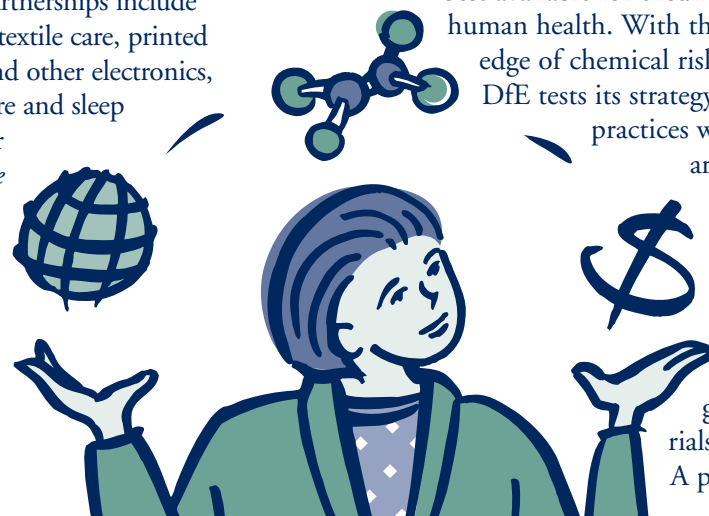
- **Technology Assessments:** A Cleaner Technologies Substitutes Assessment (CTSA) offers a DfE partnership a methodology to evaluate traditional and alternative technologies for the potential risks they pose to human health and the environment, as well as for performance and cost. The CTSA provides detailed information so that businesses can make their own decisions. In undertaking a CTSA approach, partners agree to identify the component chemicals of alternative products and processes, test, or summarize the performance of these alternatives, and analyze their costs, as well as an analysis of natural resources usage (water and energy use). The DfE Program has completed several successful partnerships and is working with several other industries using a CTSA approach. These industry partnerships include commercial printing, garment and textile care, printed wiring boards used in computers and other electronics, and adhesives used in foam furniture and sleep products. (See the DfE Web site for the *CTSA Methodology and Resource Guide*.)
- **Formulator Approach:** The DfE Program is helping companies that formulate chemicals or produce formulated products, such as detergents, for commercial use

make more informed choices by considering the characteristics and environmental impacts of alternative ingredients. Depending on the industry, the DfE Program either works with a trade association or directly with individual companies. DfE encourages participation by recognizing companies that succeed in improving the chemical profile of their products. The first DfE partners to take this approach were formulators of industrial and institutional laundry detergents. They are replacing conventional, hazardous ingredients with alternative ingredients (and byproducts) that are less toxic and more biodegradable. Building on its success with detergent formulations, DfE is entering into partnerships with the formulators of industrial and institutional cleaning products.

- **Best Practices Approach:** This approach focuses on limiting exposures to toxic chemicals as much as possible in the workplace and surrounding community. By interacting with shops onsite, the DfE Program gains a real-world perspective on the full range of practices and equipment in an industry—from the hazardous to the best available for ensuring safety and protecting human health. With this perspective and a knowledge of chemical risks and protective measures, DfE tests its strategy for promoting best shop practices within a limited geographic area. This strategy employs a combination of techniques, such as shop visits from safety equipment suppliers, industrial hygienists, and experienced tradesmen, and collaboration with trade groups, schools, and raw materials suppliers and their networks. A partnership with the auto refin-

ishing industry in Philadelphia, Pennsylvania, identified best practices for reducing exposure to volatile organic chemicals and hazardous air pollutants.

- **Greening the Supply Chain:** Manufacturers of complex products, such as automobiles, appliances, ships, and aircraft, depend on a broad network of suppliers for parts and assemblies. Many of the suppliers in these supply chains (or tiers) are small- and medium-size companies. By applying various approaches to manufacturing and purchasing decisions throughout a network of suppliers, DfE is promoting pollution prevention and the reduction of exposures and risks in these small facilities. A pilot project is under way with the Saturn Corporation to "green" its suppliers of automobile parts.
- **Integrated Environmental Management Systems:** The DfE Program developed an Integrated Environmental Management System (IEMS) that emphasizes reducing risk to the public and the environment, pollution prevention, and wise resource management. DfE's *IEMS Implementation Guide* walks businesses through the standard EMS components and also provides "how to" insights and worksheets for process mapping, substitutes assessments, and risk evaluation. Pilot projects with several screen printing companies demonstrated that even a small company can develop a sophisticated, action-oriented IEMS.
- **Life-cycle Assessments:** Life-cycle assessments (LCAs) examine the environmental impacts of products over their entire life-cycle, from materials acquisition to manufacturing, use, and disposition. LCAs evaluate impacts on human health, atmospheric resources/air quality, water quality, ecological systems, and natural resource consumption. In the DfE Computer Display Project, project partners have used the LCA and CTSA (technology assessment) methodologies to evaluate the life-cycle environmental impacts, performance, and cost of liquid crystal displays (LCDs) and cathode-ray tubes (CRTs). DfE expects that the information generated will allow the electronics industry to perform improvement assessments, which will allow them to design products and processes that reduce the release and use of toxic chemicals and risks to human health and the environment.



**EPA's DfE Partnerships** • Garment and textile care • Printed wiring boards used in computers and other electronics • Commercial printing (screen printing, lithography, and flexography) • Industrial and institutional cleaning formulations • Auto refinishing • Adhesives used in foam furniture and sleep products • Computer displays • Automobile suppliers